



CLEARING THE AIR

2019 APCD Workshop Series

Are you curious about the air you breathe, what's in it, and how it's protected?

Join us at our free monthly workshops and get an in-depth look at how we keep the air clean.

FEBRUARY 18	JULY 15
MARCH 18	AUGUST 19
APRIL 15	SEPTEMBER 16
MAY 20	OCTOBER 21
JUNE 17	NOVEMBER 18

6 p.m-7:30 p.m. | Louisville Free Public Library, 301 York St.

For more info, go to www.louisvilleky.gov/APCD
(502) 574-6000

CLEARING THE AIR

2019 APCD Workshop Series



The [APCD Workshop Series](#) seeks to:

- Increase the community's understanding of Louisville's air and of APCD's many functions
- **EMPOWER** citizens
- Provide a more informal forum for dialogue, Q&A and feedback
- Continue with community engagement efforts

CLEARING THE AIR

2019 APCD Workshop Series



Today's workshop seeks to:


1. Review the current NAAQS for ozone in Louisville.
2. Provide an overview of results from the Ozone Formation Study and discuss next steps.
3. Introduce APCD's upcoming efforts to develop strategies that reduce ozone and find co-benefits that reduce other pollutants.
4. Obtain ideas/suggestions/feedback from the community on how to best meet the NAAQS for ozone.

CLEARING THE AIR

2019 APCD Workshop Series



Remember...

- There are **NO** silly questions
- Public Participation = 
- Interactive/informal workshop
 - Ask questions as they come to mind
 - Feedback? Email Clearingtheair@louisvilleky.gov



Ozone in Louisville

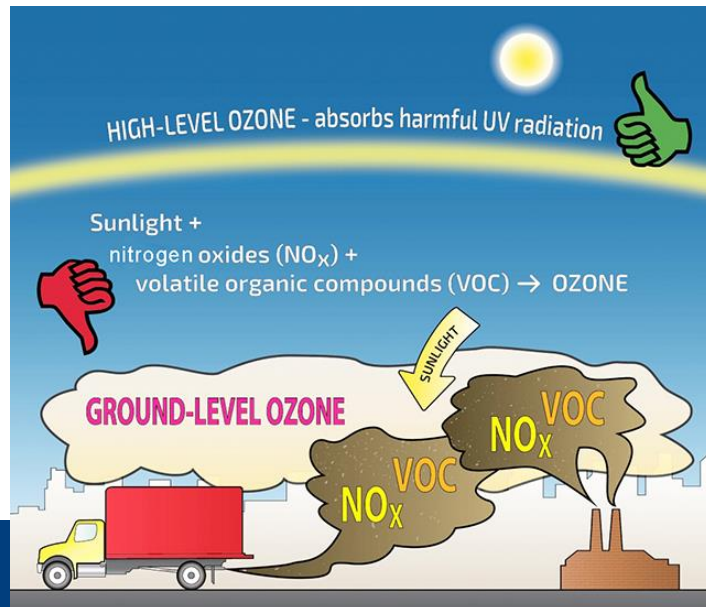
Pt. 2

Air Pollution Control District
10/21/2019



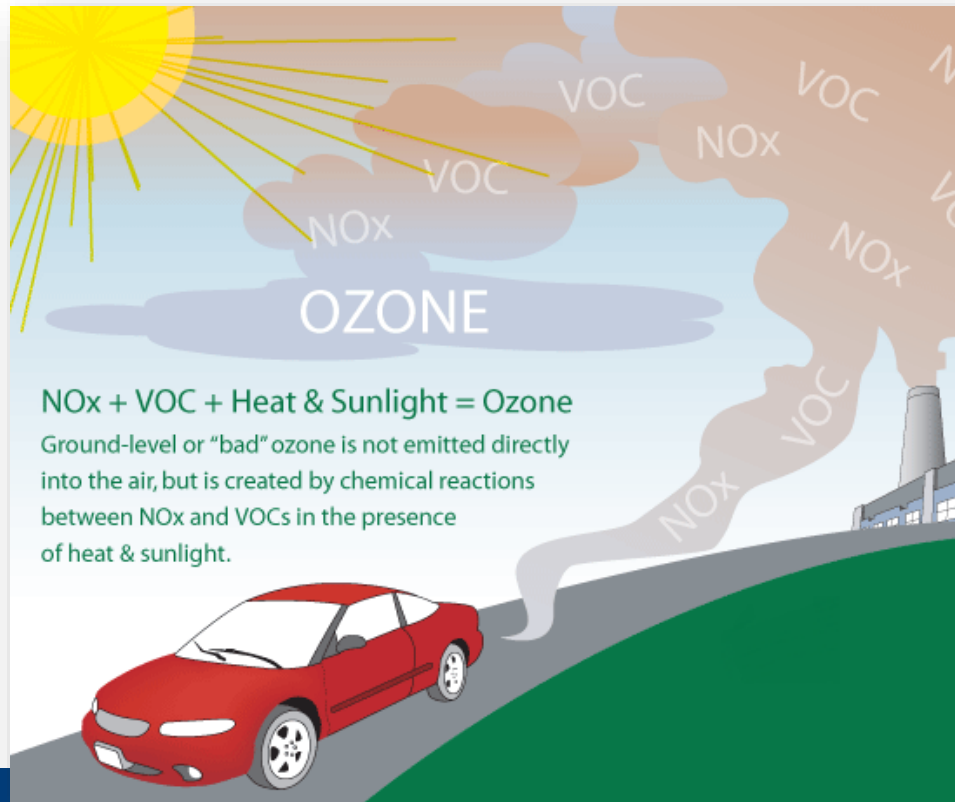
Ground-level Ozone vs. Stratospheric Ozone

- Ground-level Ozone
 - “Bad” ozone
 - Colorless
 - Highly irritating gas
 - Forms just above the earth’s surface
 - Secondary pollutant
 - Created via a chemical reaction
- Stratospheric Ozone
 - “Good” ozone
 - Stratospheric layer protects from the sun’s ultraviolet rays



How is ground-level ozone formed?

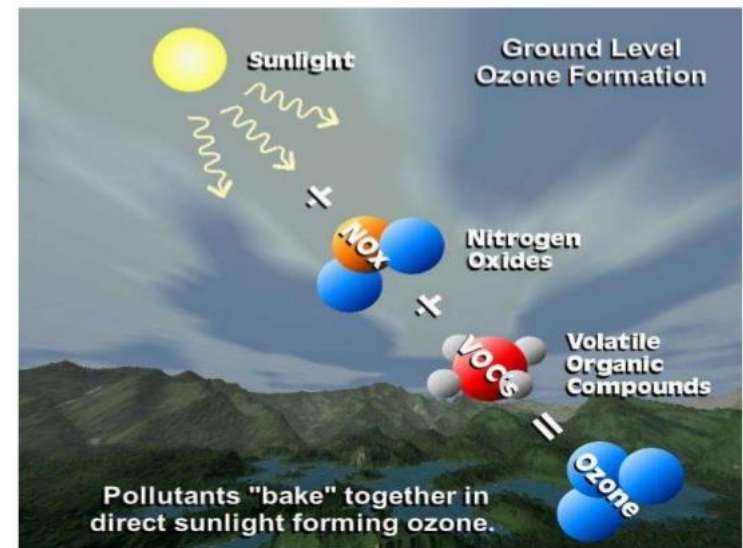
Ground-level Ozone: **$\text{NO}_x + \text{VOCs} + \text{Sunlight} = \text{O}_3$**



Meteorology

- Assists with the chemical reaction that creates “bad” ozone (*i.e.* sunlight)
- Warm, sunny, dry and stagnant days can create more ground-level ozone
- Can move through a region slowly and accumulate in areas downwind of sources

Chemistry



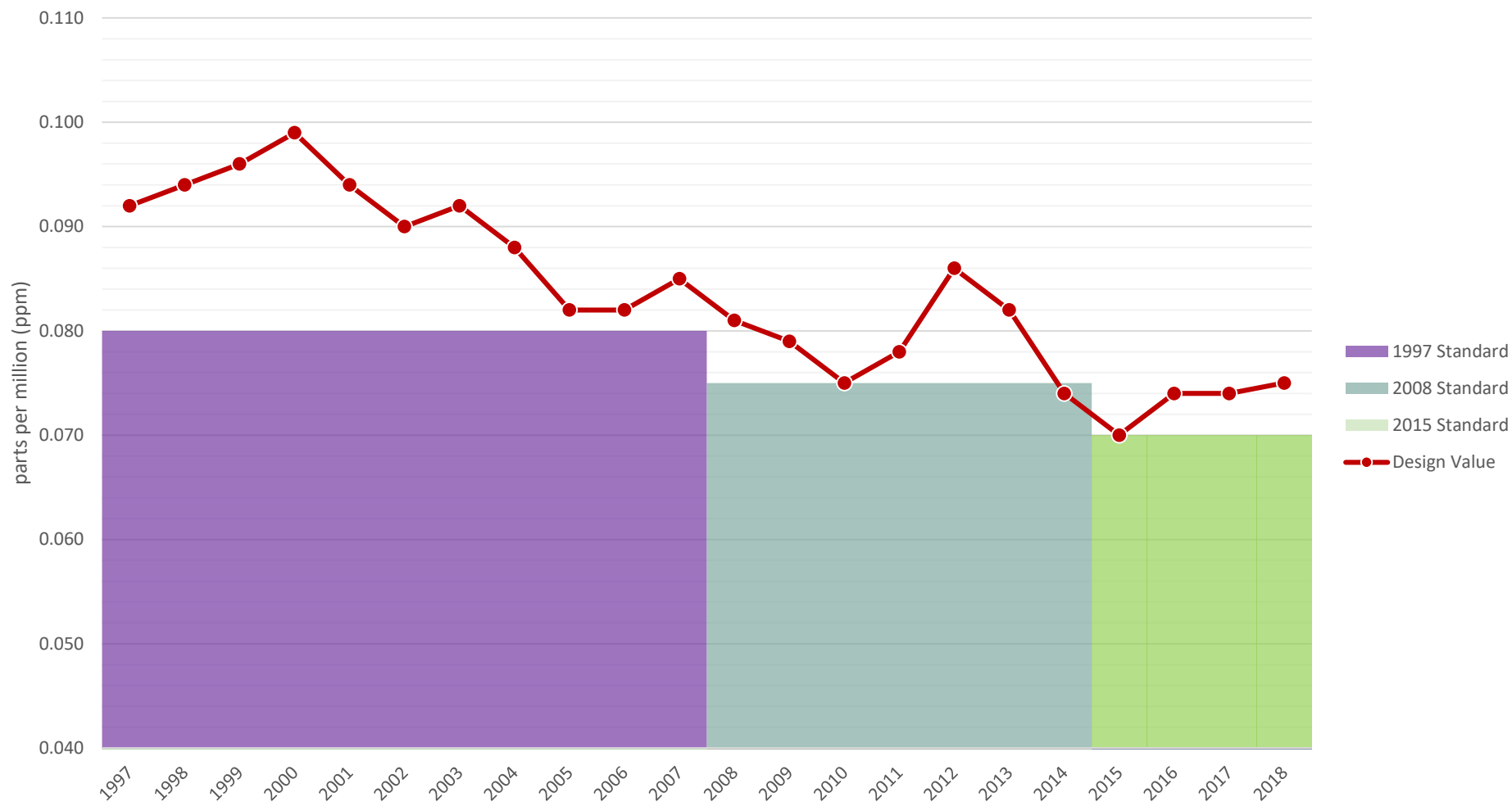
Health/Environmental Effects

Health	Environment
<ul style="list-style-type: none">• Limits outside activity for sensitive and vulnerable populations (<i>e.g.</i> children, elderly)	<ul style="list-style-type: none">• Interferes with sensitive plants/vegetations ability to survive
<ul style="list-style-type: none">• Triggers asthma attacks (if asthmatic)	<ul style="list-style-type: none">• Reduces forest growth
<ul style="list-style-type: none">• Impacts the ability to fight other infections of the lungs (<i>e.g.</i> colds)	<ul style="list-style-type: none">• Transforms the quality of a defined habitat

Current NAAQS Status

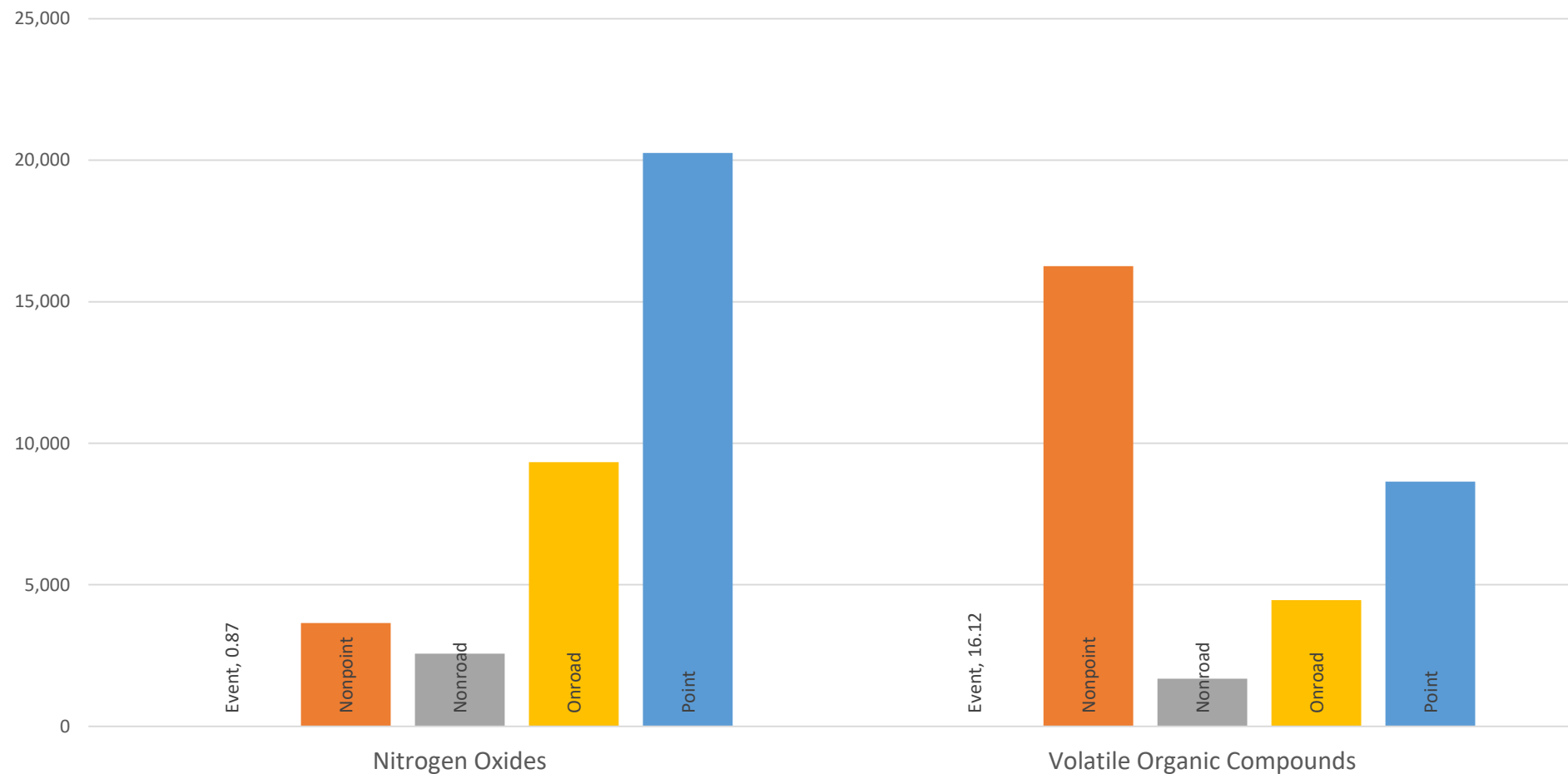
Pollutant	Standard	Averaging Time	Attainment Status
Carbon Monoxide	9 ppm	8-hour	Attainment
	35 ppm	1-hour	Attainment
Lead	0.15 $\mu\text{g}/\text{m}^3$	Rolling 3-month Average	Attainment
Nitrogen Dioxide	53 ppb	Annual Average	Attainment
	100 ppb	1-hour	Attainment
Particulate Matter (PM10)	150 $\mu\text{g}/\text{m}^3$	24-hour	Attainment
Particulate Matter (PM2.5)	12.0 $\mu\text{g}/\text{m}^3$	Annual Average	Attainment
	35 $\mu\text{g}/\text{m}^3$	24-hour	Attainment
Ozone	0.070 ppm	8-hour	Nonattainment
Sulfur Dioxide	75 ppb	1-hour	Partial County Nonattainment

Ozone Trend

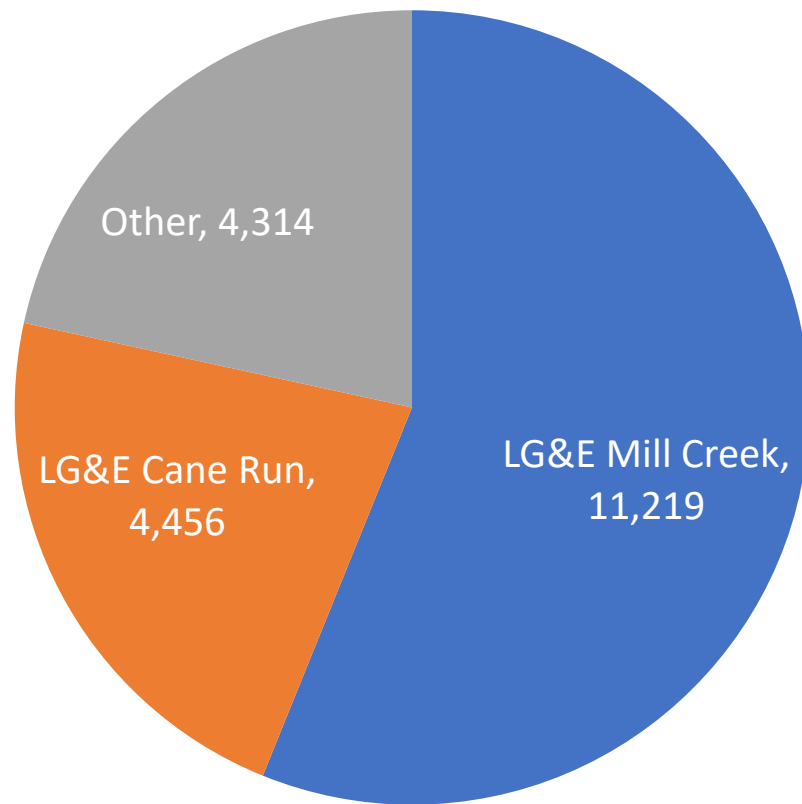


Ozone Formation

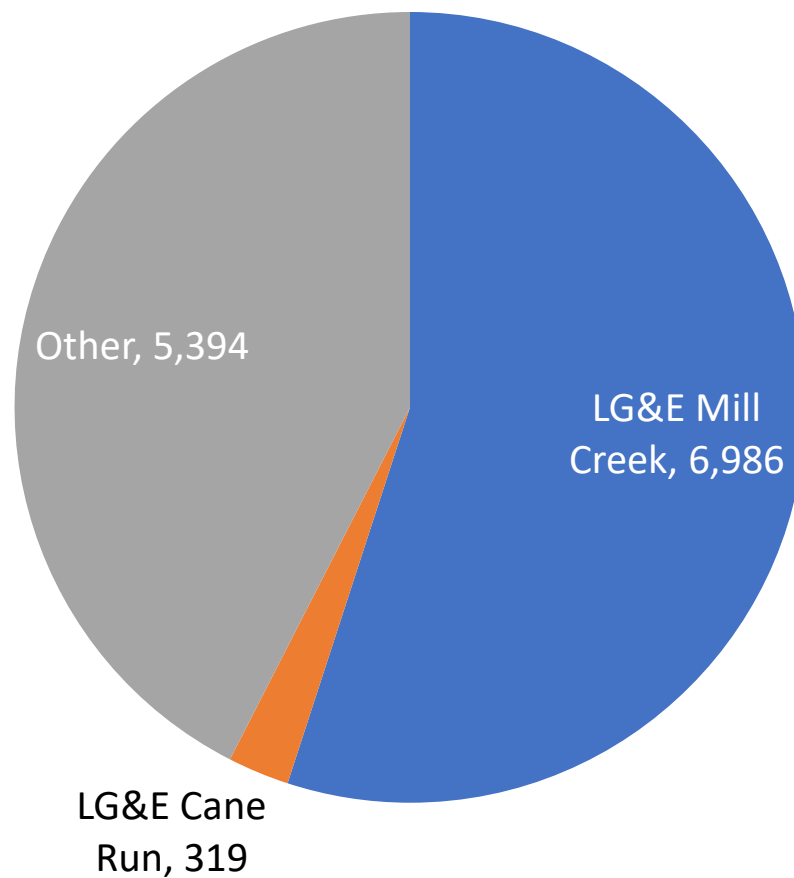
2014 NEI



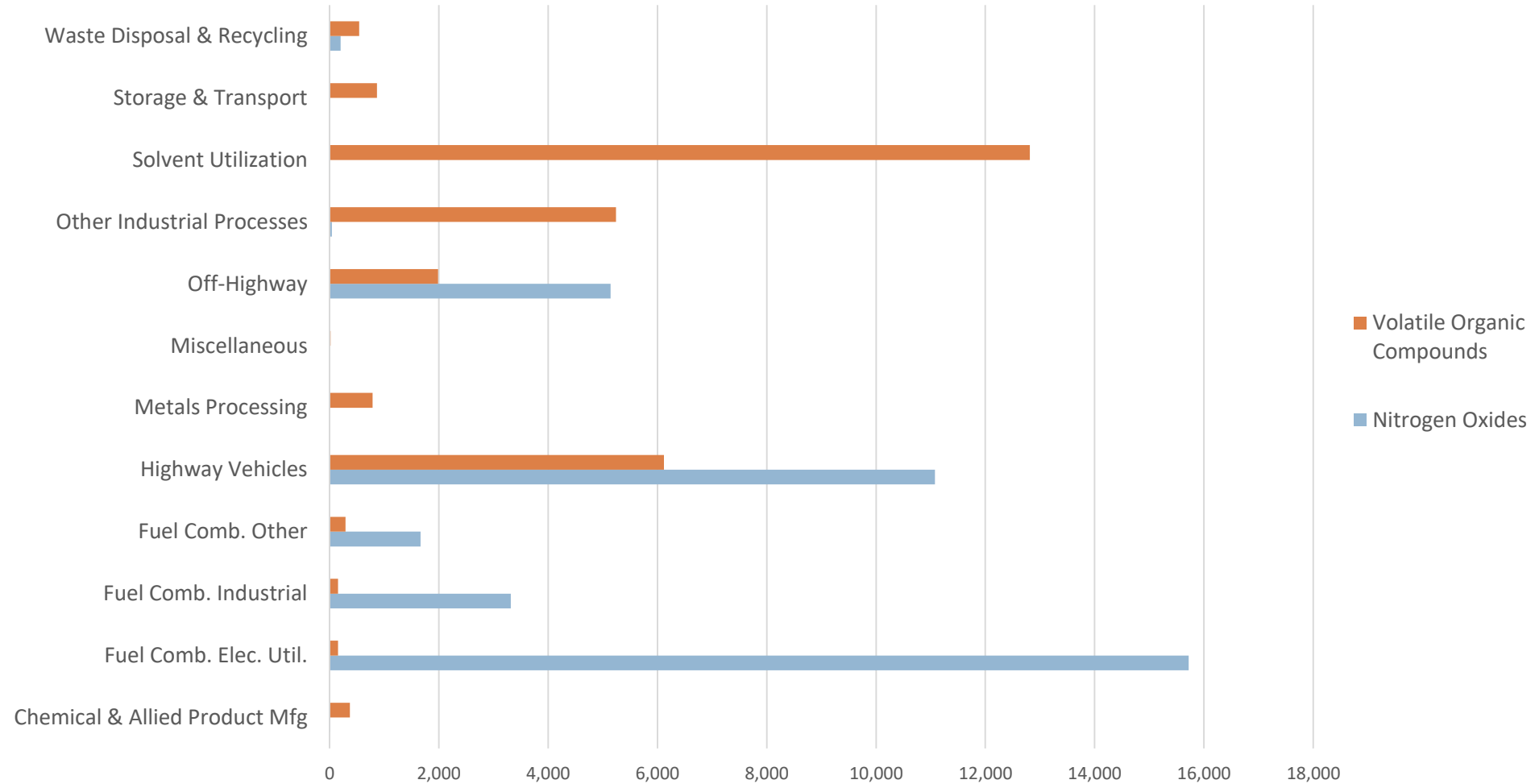
Louisville NO_x Point Sources - 2014



Louisville NO_x Point Sources - 2017



Sources



Monitoring and Communicating Ozone Air Quality Data

- EPA National Ambient Air Quality Standards (NAAQS)
- APCD air monitoring network
- Air Quality Index (AQI)



LOUISVILLE
AIR WATCH

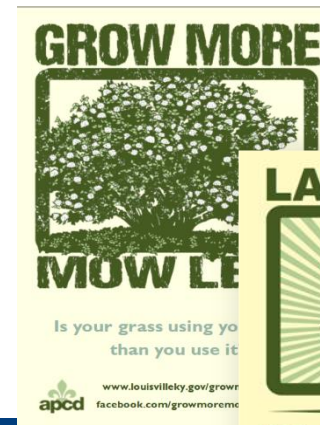
[Click here for real-time air monitoring data](#)



Addressing Ozone Pollution

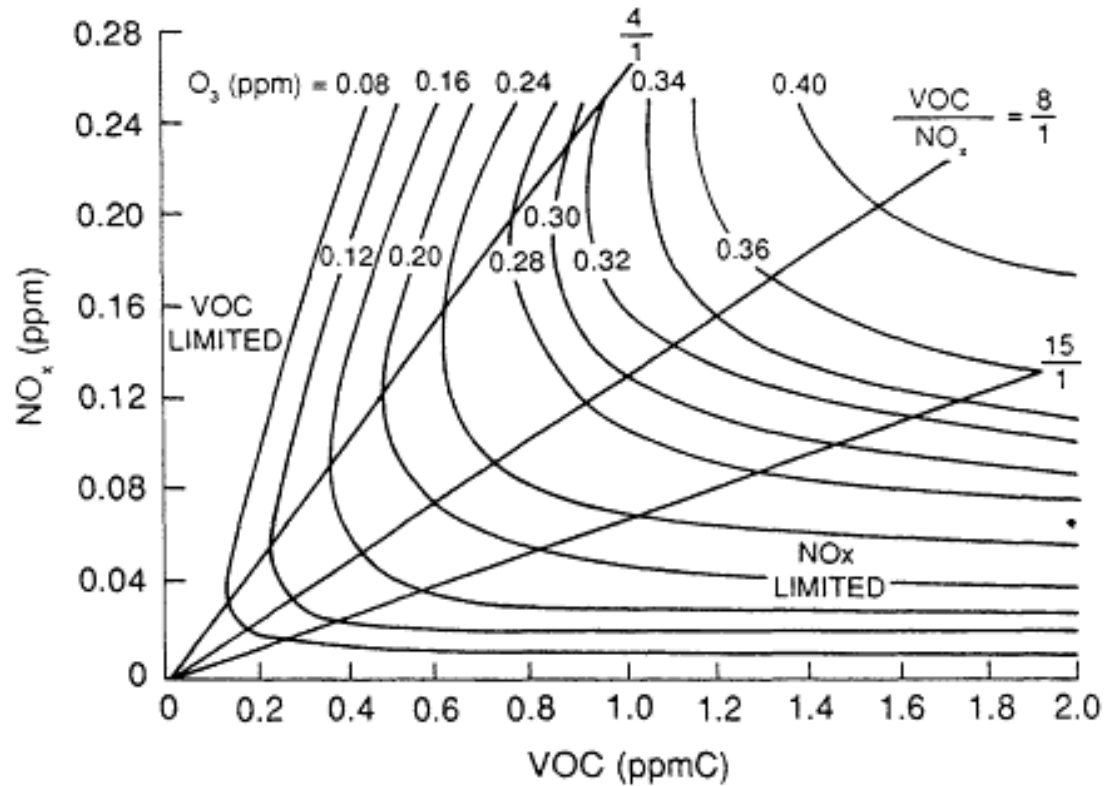
Addressing Ozone Pollution

- Ozone Formation Study
- U.S. EPA/APCD Multi-Pollutant Risk-Based AQ Management Strategy Project
- SIP Planning
- LMG Initiatives
- KAIRE – Idle Free
- Grow More Mow Less
- Lawn Care for Cleaner Air
- Energy Efficiency



Ozone Formation

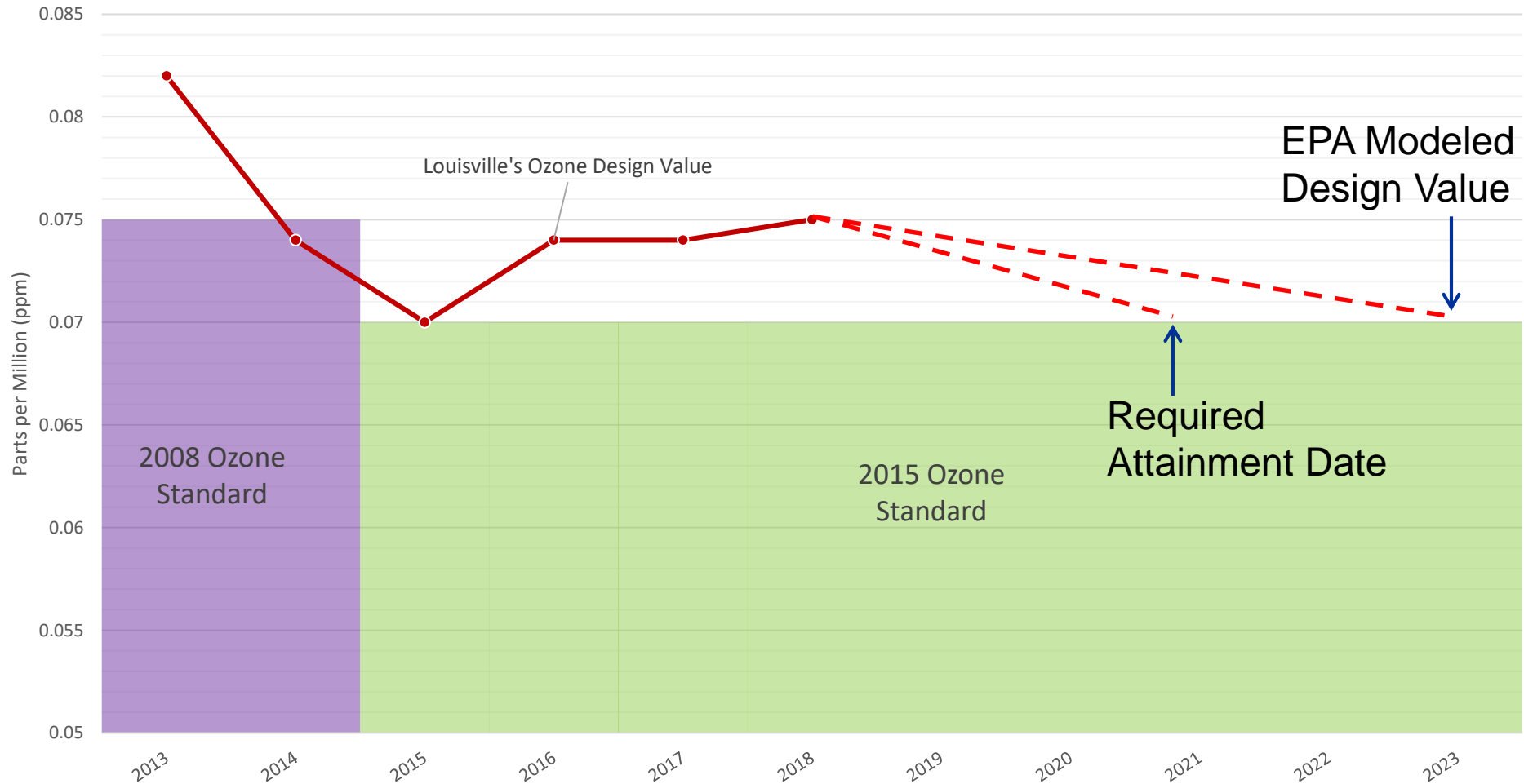
- NO_x + VOCs + Sunlight



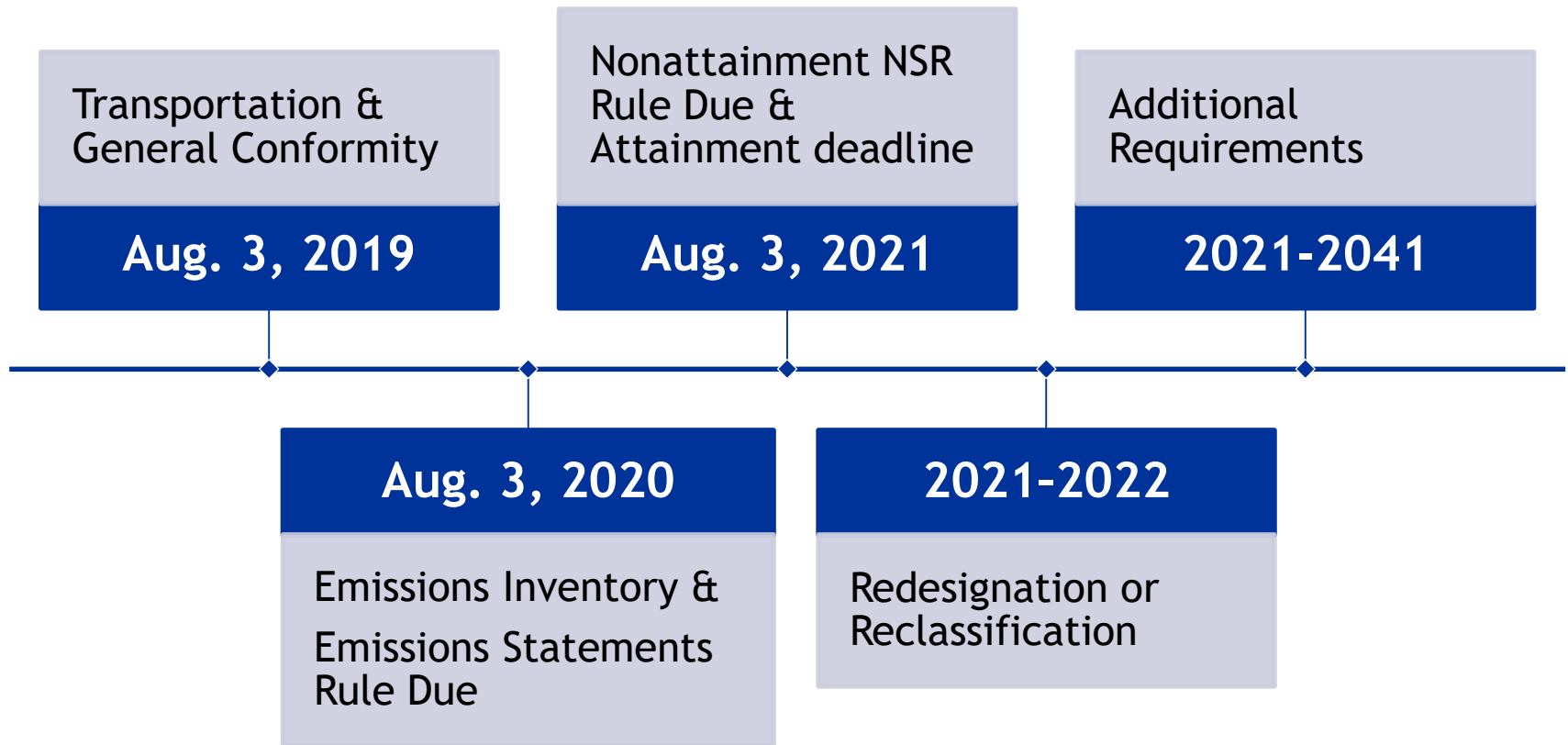
Ozone Formation



Ozone Projections



SIP Planning



What is the Ozone Formation Study?

- A modeling approach to help APCD determine if elevated ozone in the Louisville Non-Attainment Area is NOX-limited or VOC-limited

Prepared for:
Louisville Metro Air Pollution Control District
701 West Ormsby Avenue, Suite 303
Louisville, Kentucky, 40203

Prepared by:
Ramboll US Corporation
7250 Redwood Blvd., Suite 105
Novato, California 94945

October 2019

Ozone Formation Study: Model Performance Evaluation and NOx/VOC Sensitivity Final



RAMBOLL Bright ideas. Sustainable change.

Ozone Formation Study

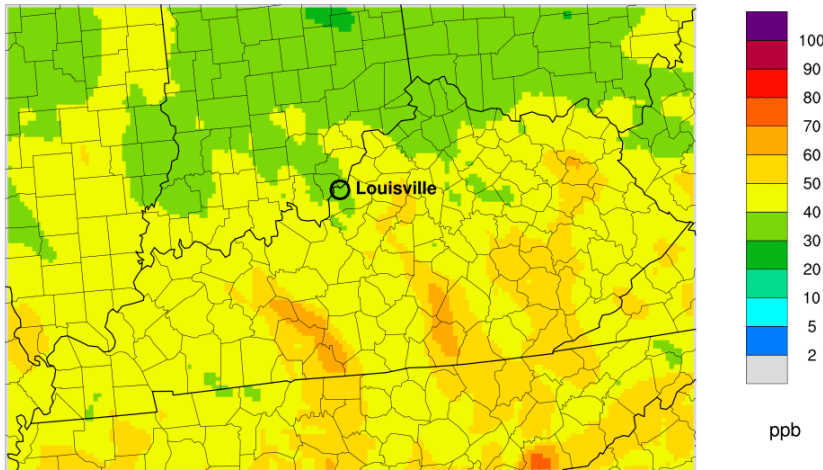
Goal	Outcomes
<ul style="list-style-type: none">Refine understanding for the regional drivers of ozone formation to make strategic policy decisions	<ul style="list-style-type: none">Comprehensive inventory of compounds contributing to the formation of ozoneRefined understanding of Ozone sensitivity to NOx/VOC reductions



Modeling

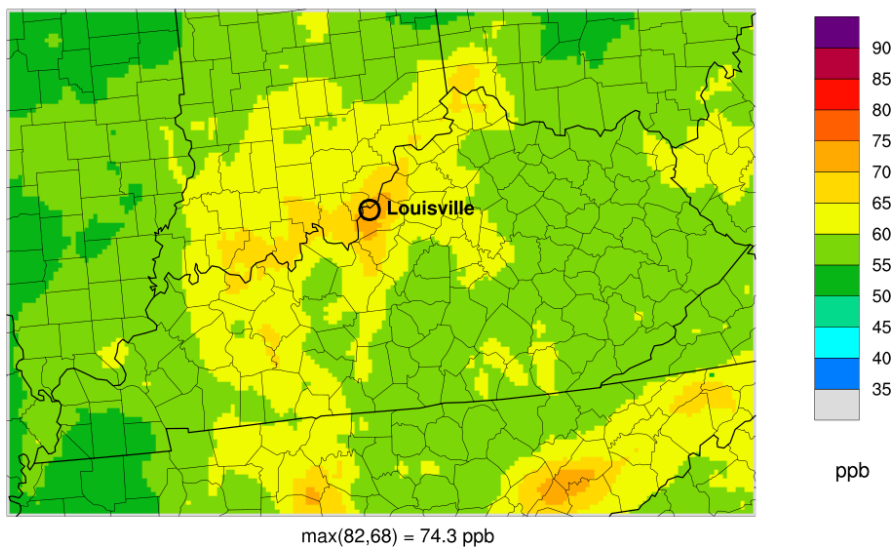
- Hourly modeling on 4-km grid
- Base Case
- 25% NO_x Reduction
- 25% VOC Reduction

Ozone 2016-06-29 00:00 UTC

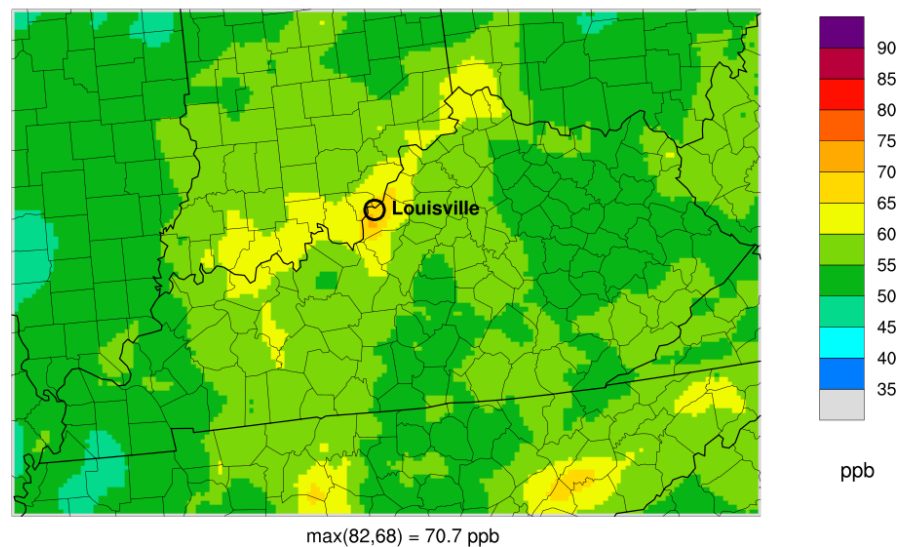


NO_x Sensitivity

Average MD8A Ozone Concentration for Top 10 Highest Observed MD8A Days

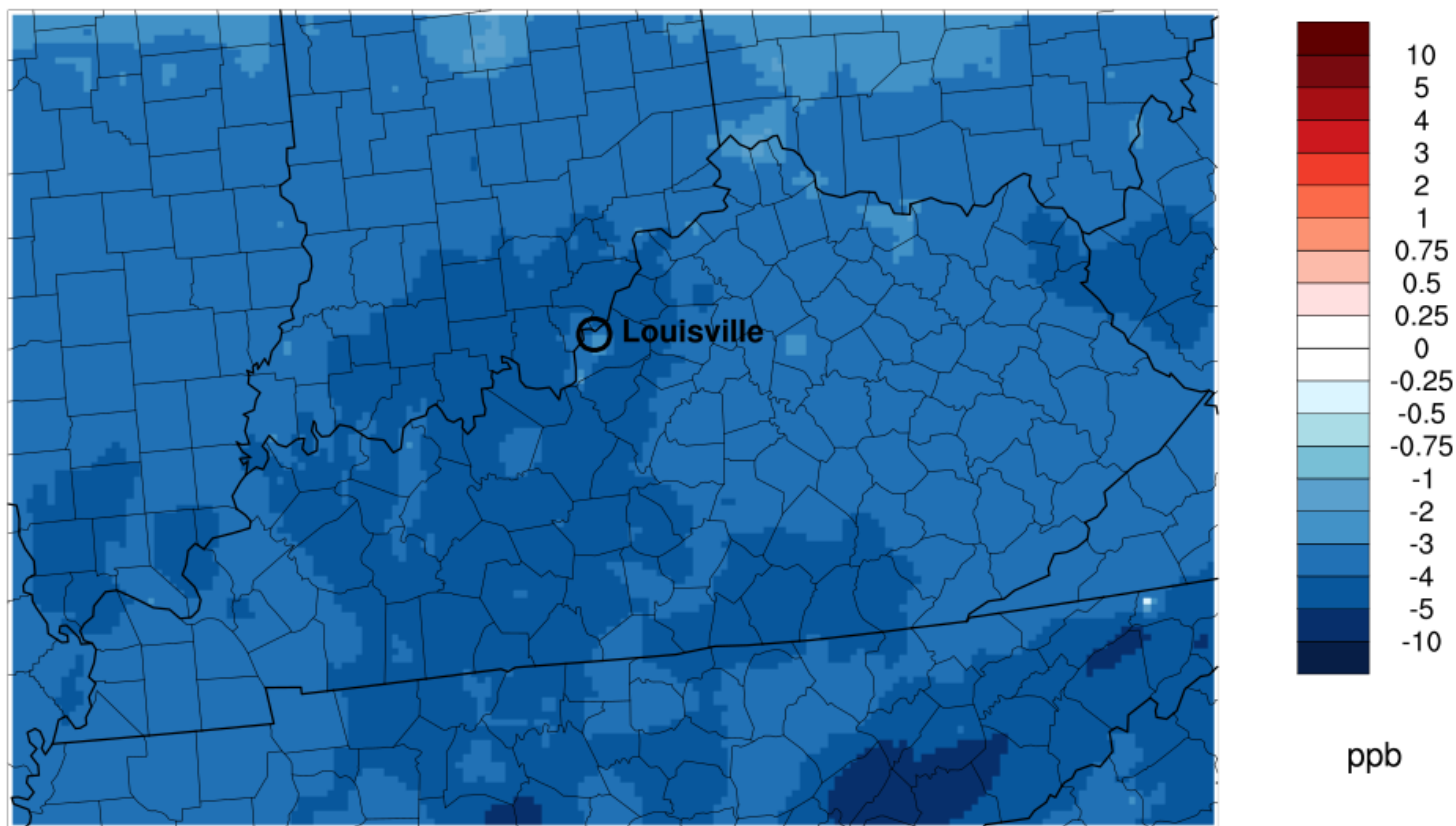


Average MD8A Ozone Concentration for Top 10 Highest Observed MD8A Days



NO_x Sensitivity

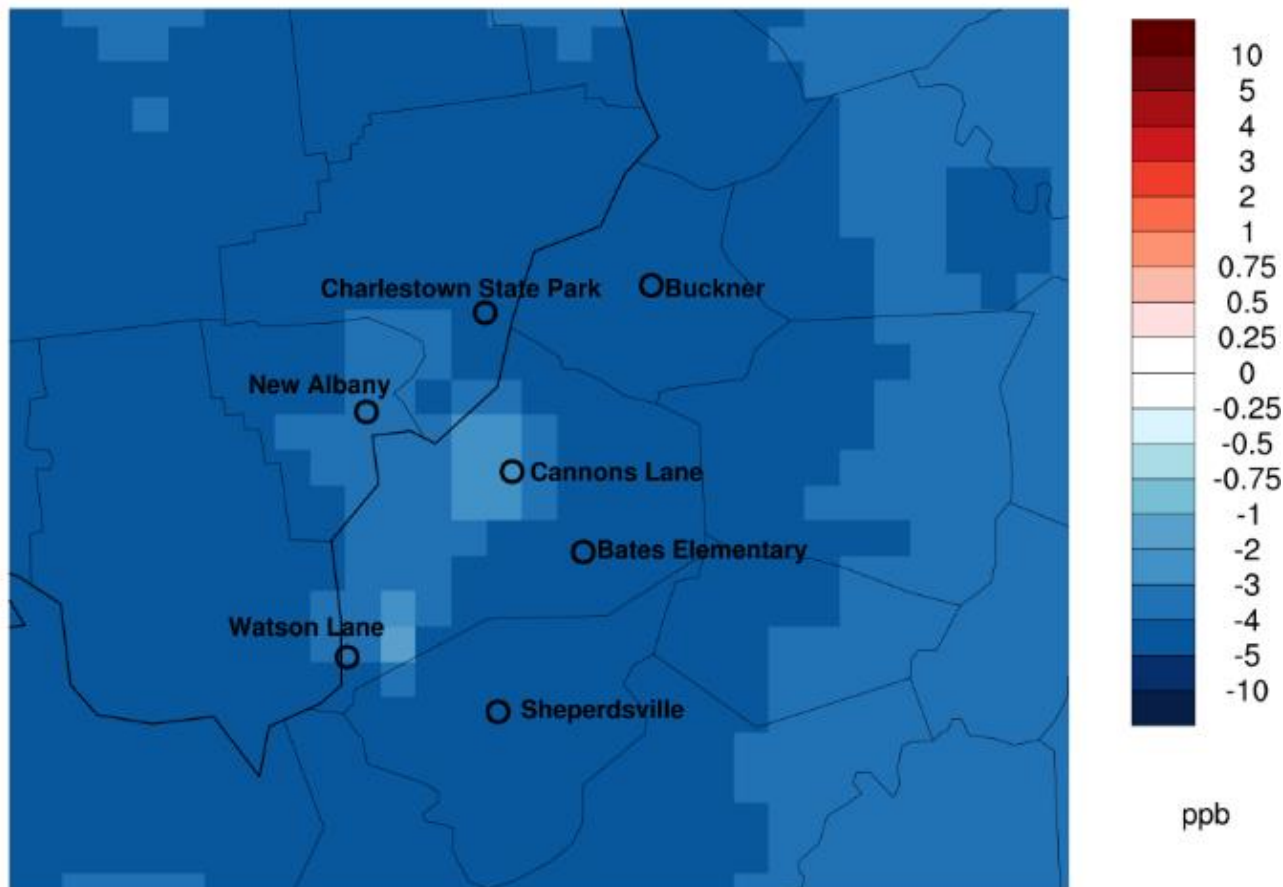
Average MD8A Ozone Difference for Top 10 Highest Observed MD8A Days



min(127,7) = -6.2 ppb

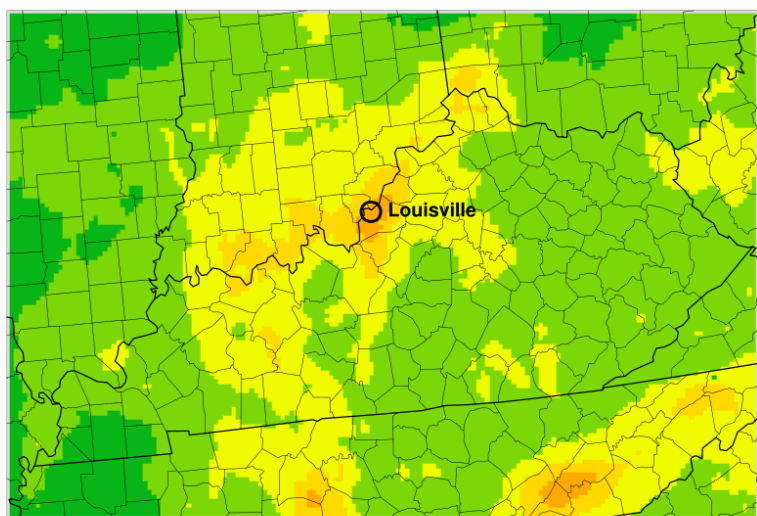
NO_x Sensitivity

Average MD8A Ozone Difference for Top 10 Highest Observed MD8A Days

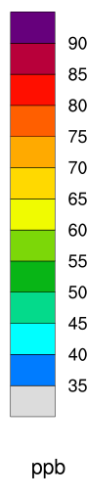


VOC Sensitivity

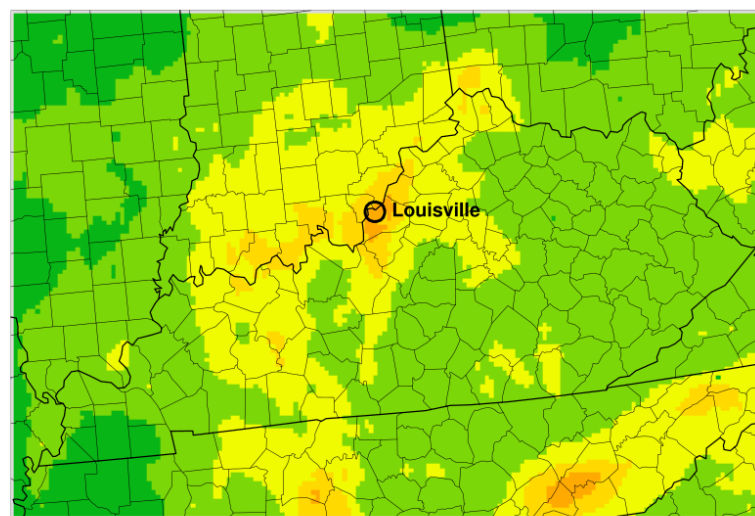
Average MD8A Ozone Concentration for Top 10 Highest Observed MD8A Days



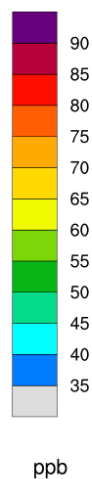
max(82,68) = 74.3 ppb



Average MD8A Ozone Concentration for Top 10 Highest Observed MD8A Days

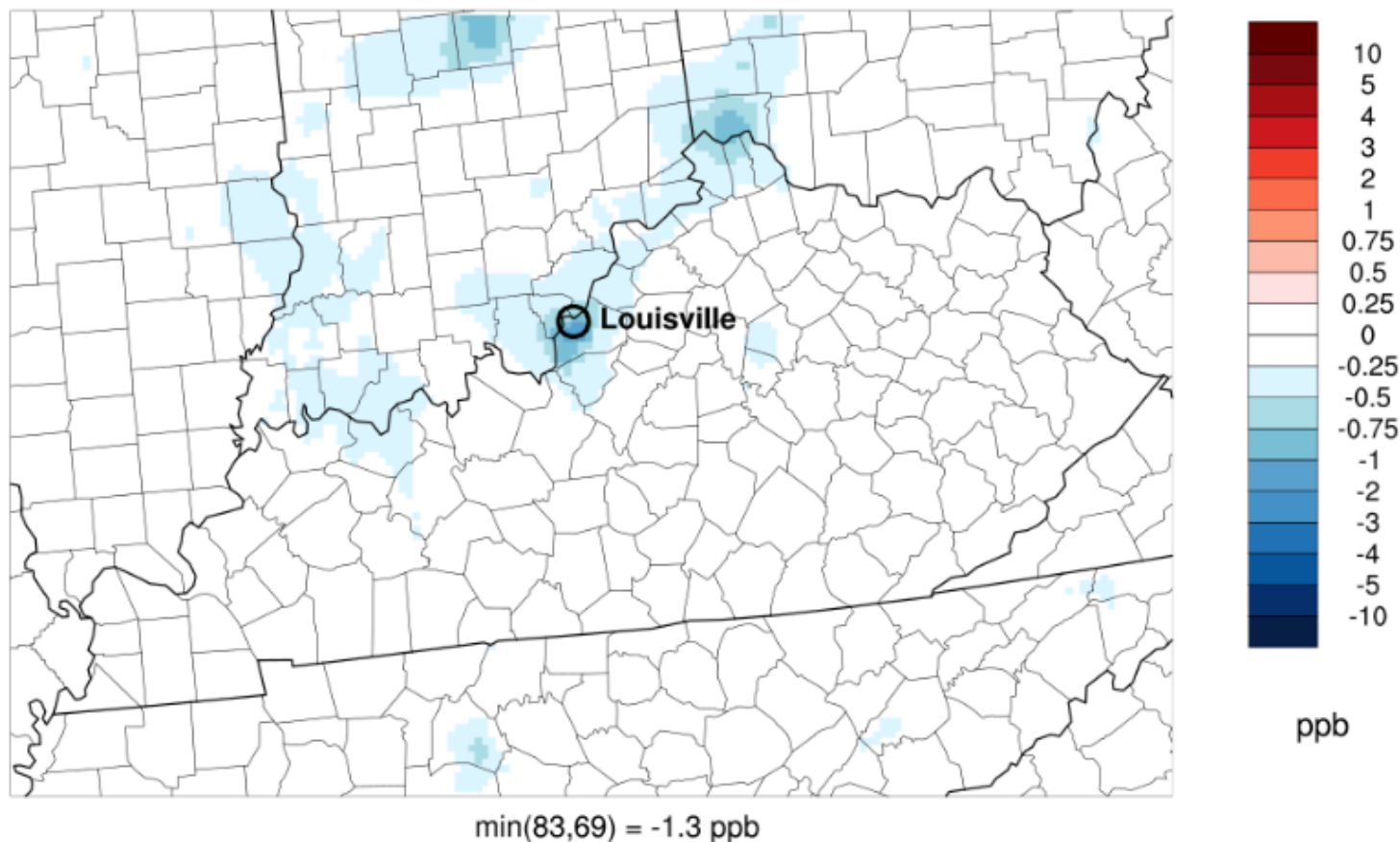


max(82,68) = 73.3 ppb



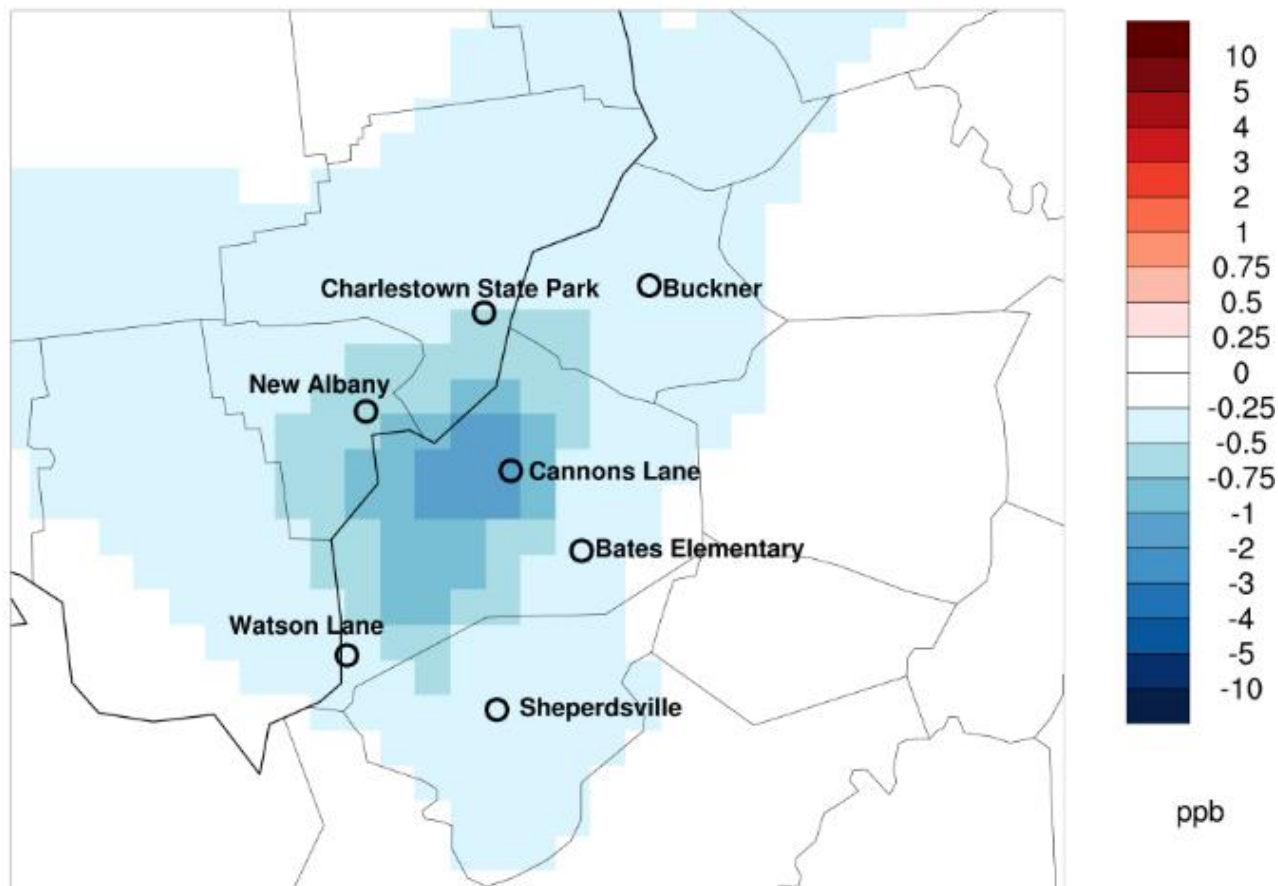
VOC Sensitivity

Average MD8A Ozone Difference for Top 10 Highest Observed MD8A Days

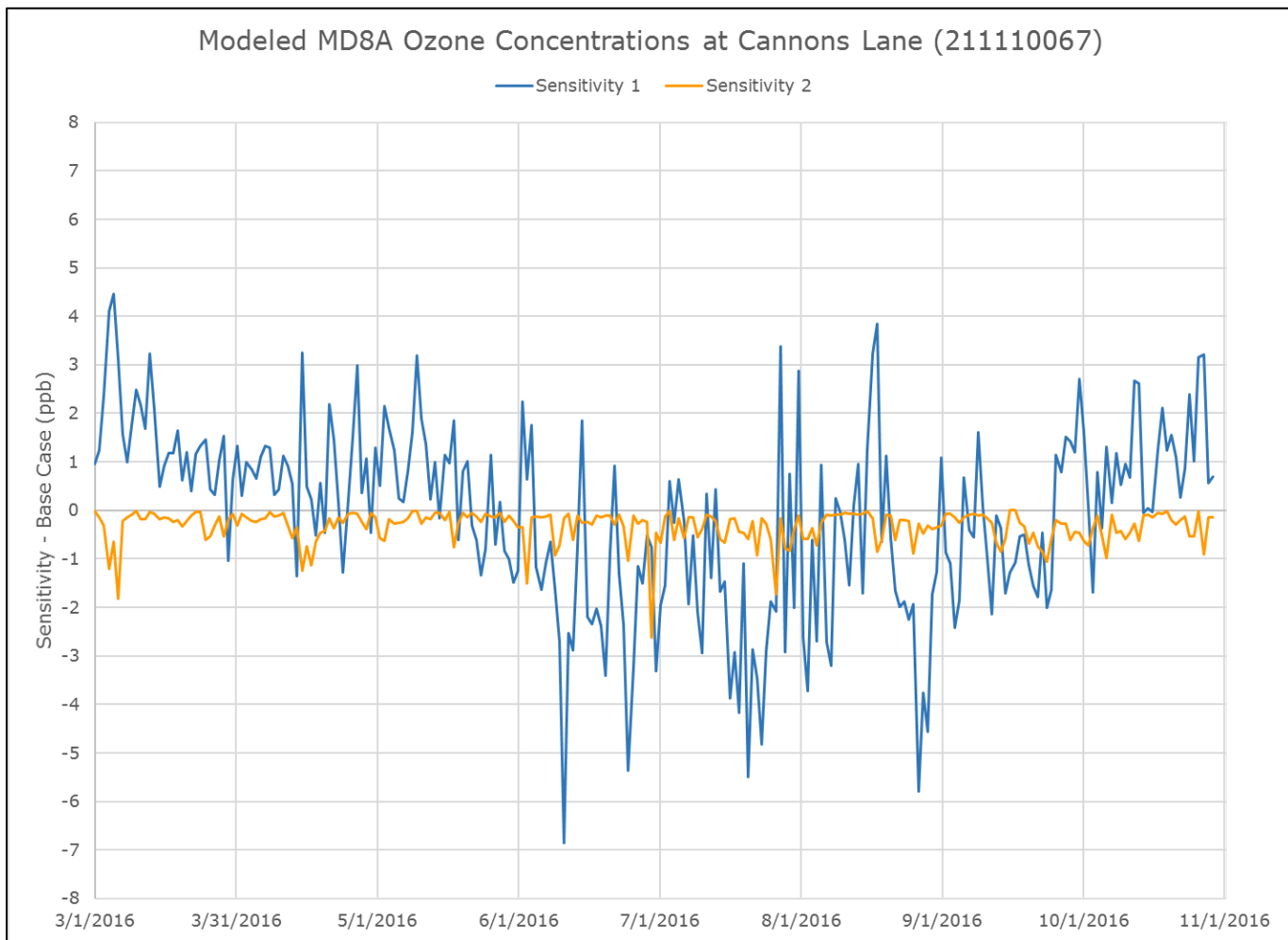


VOC Sensitivity

Average MD8A Ozone Difference for Top 10 Highest Observed MD8A Days



Comparison



Multi-Pollutant Risk-Based AQ Management Strategy Project

Goal(s)	Outcomes
<ul style="list-style-type: none">• Evaluate and prioritize control strategies to reduce ozone and come into attainment with NAAQS• Explore co-benefits of ozone reduction strategies to air toxics and fine particulate emissions• Use BenMAP to quantify the anticipated health benefits of air quality improvements	<ul style="list-style-type: none">• Prioritized emission reduction strategies• Quantified health outcome improvements and associated benefits• Stakeholder input

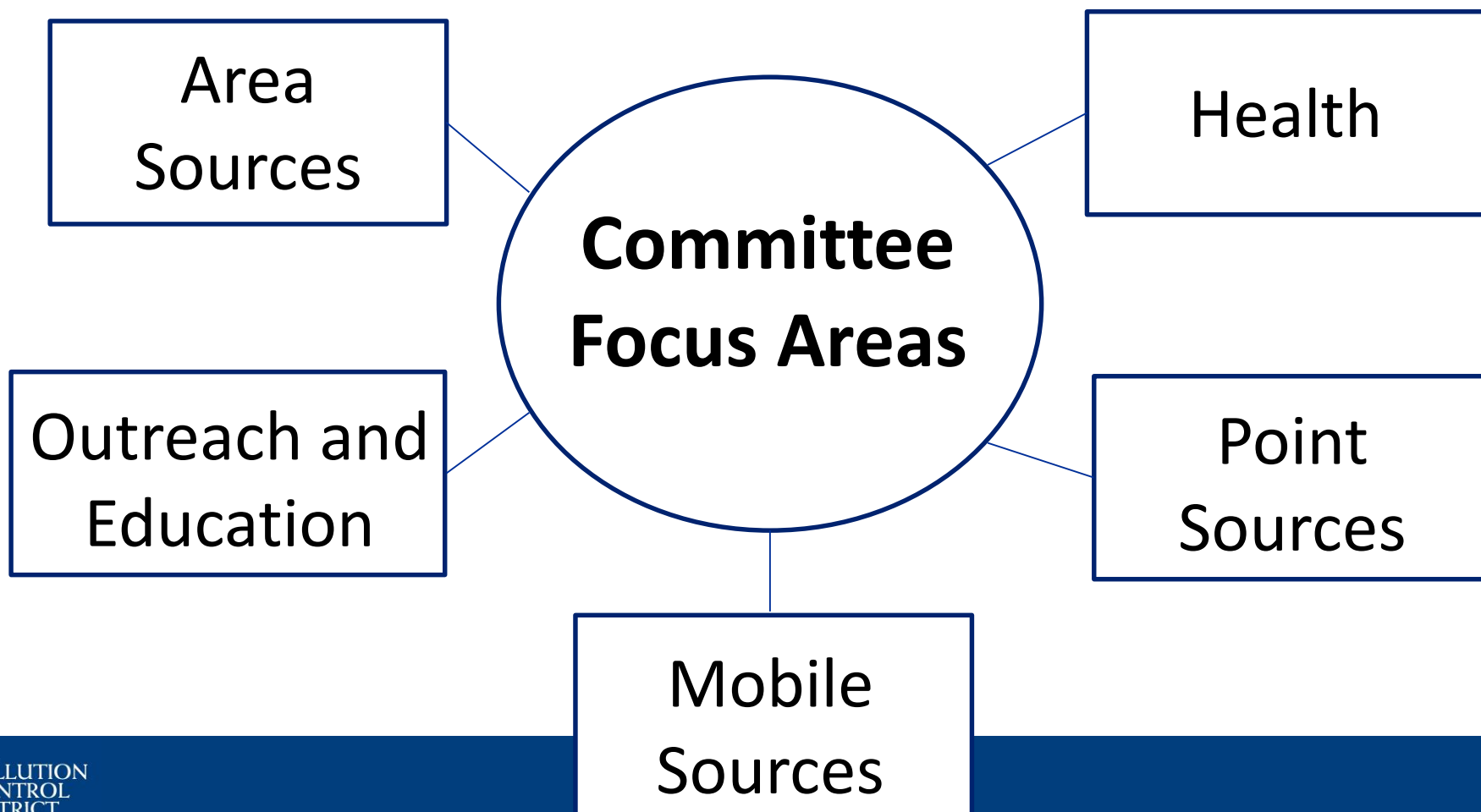


Multi-Pollutant Stakeholder Workgroup

Gain recommendations as to the next steps Louisville can take to **improve air quality** AND reduce **health impacts associated with air pollution exposure**

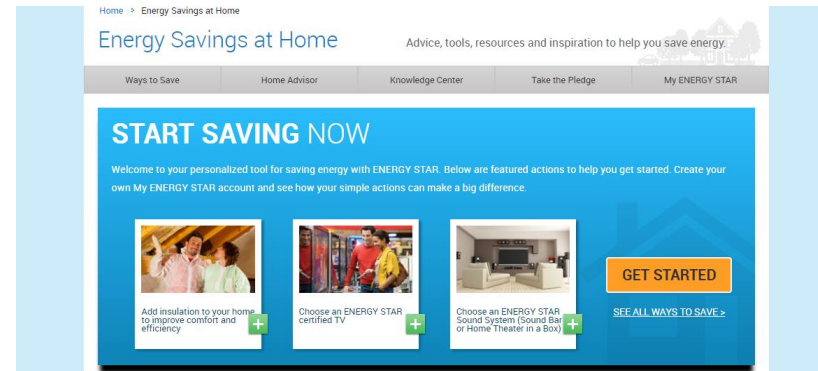
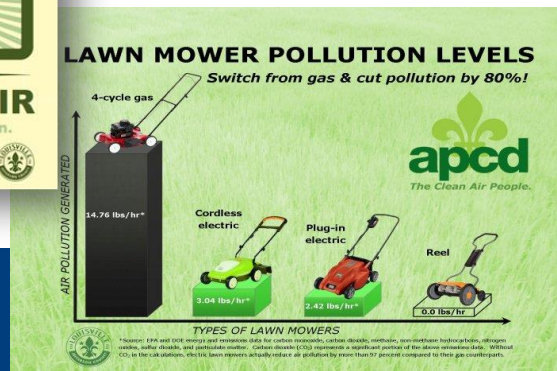
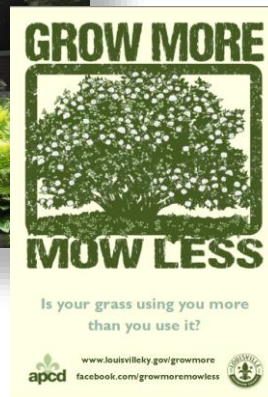
Convene a **broad range of community stakeholders** to discuss current air quality challenges

Multi-Pollutant Stakeholder Workgroup



Moving Forward

Voluntary Actions



AIR
POLLUTION
CONTROL
DISTRICT



Open Discussion

What other ways can we, as a community, work to reduce ozone?



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Questions?

Louisville Metro Air Pollution Control District

701 W. Ormsby Ave.
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Louisville, Ky. 40203

(502) 574-6000

www.louisvilleky.gov/APCD

Keith H. Talley Sr., Director

Resources

Air Pollution Control District

Louisvilleky.gov/APCD

Environmental Protection Agency (EPA)

Epa.gov/ground-level-ozone-pollution/ground-level-ozone-basics

Epa.gov

Epa.gov/Region4

Department of Energy

<https://www.energy.gov/energysaver/energy-saver>

Louisville Air Watch

Airqualitymap.louisvilleky.gov/

AirNow

Airnow.gov/

Kentucky Division of Air Quality

Air.ky.gov

Energy Star

<https://www.energystar.gov/>

Resources

KAIRE

Helptheair.org

Facebook.com/helptheair

Twitter.com/helptheair

Lawn Care for Cleaner Air

Louisvilleky.gov/government/lawn-care-cleaner-air

Grow More Mow Less

Louisvilleky.gov/government/air-pollution-control-district/grow-more-mow-less

Facebook.com/GrowMoreMowLess

Every Commute Counts

<https://everycommutecounts.org/>